IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. When strikethrough cannot easily be perceived, or when five or fewer characters are deleted, [[double brackets]] are used to show the deletion. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered). Please AMEND claims 2, 13, 24, and 26 in accordance with the following:

1. (withdrawn) A plasma etching method for etching a workpiece comprising:

placing the workpiece in a processing chamber defined by a reaction tube made of a dielectric material;

introducing a processing gas into the processing chamber;

supplying high frequency power to a high frequency antenna located outside the reaction tube, the high frequency antenna having a portion that has a relatively large capacitive coupling with the reaction tube;

generating a plasma in the processing chamber by the supplied high frequency power; and

moving at least one of the high frequency antenna and the reaction tube relative to the other.

2. (currently amended) A plasma etching apparatus comprising:

a reaction tube including an outer circumference and made of a dielectric material in the form of a cylinder;

a high frequency coil antenna comprising first and second winding segments, located around the reaction tube and electrically connected to a power supply and a ground to generate a plasma inside the reaction tube, ~~the high frequency coil antenna including~~ and a ~~portion~~ third segment, continuously formed with the first and the second winding segments and successively extending between the first and the second winding segments to produce ~~that produces~~ a relatively large uniformly distributed capacitive coupling with the reaction tube ~~and is formed between a power supply terminal connected to a plasma source high frequency power supply,~~

~~and a ground terminal connected to a ground~~, said third segment being closer to the outer circumference of the reaction tube than the first and second winding segments;

a drive mechanism to move at least one of the high frequency coil antenna and the reaction tube relative to the other to perform plasma etching at a variable speed; and

a controller connected to the drive mechanism to control a relative moving speed between the high frequency coil antenna and the reaction tube, wherein the uniformly distributed capacitive coupling between the high frequency coil antenna and the reaction tube reduces a depositing rate of etching products to extend a cleaning interval for cleaning inner walls of the reaction tube.

3. (previously presented) The plasma etching apparatus according to claim 2, wherein the high frequency coil antenna includes a plurality of winding portions, and the portion that produces a relatively large capacitive coupling with the reaction tube includes a sloped segment continuously formed between two of the plurality of winding portions in series, and the sloped segment is located closer to the reaction tube than the plurality of winding portions.

4. (withdrawn) The plasma etching apparatus according to claim 3, wherein the thickness of the sloped segment increases at locations closer to the grounding terminal.

5. (withdrawn) The plasma etching apparatus according to claim 2, further comprising a rotary connector having a center shaft that is coaxial with the reaction tube, the rotary
connector having an output unit rotatably supported by the center shaft and connected to the power supply terminal, the plasma source high frequency power supply being connected to the center shaft.

6. (withdrawn) The plasma etching apparatus according to claim 5, wherein the center shaft is a hollow shaft, and the etching apparatus further comprises:

a gas introducing port in communication with the hollow shaft for introducing the processing gas from above the processing chamber; and

a temperature sensor cable, which passes through the hollow shaft for adjusting the temperature in the processing chamber.

7. (previously presented) The plasma etching apparatus according to claim 2, wherein the portion that produces a relatively large capacitive coupling with the reaction tube is located closer to the reaction tube than the remaining portion of the high frequency coil antenna.

8. (withdrawn) The plasma etching apparatus according to claim 2, wherein the area of a surface of the high frequency antenna that faces the reaction tube to be increases at locations closer to the ground terminal.

9. (withdrawn) The plasma etching apparatus according to claim 2, wherein a part of the high frequency antenna is formed by twisting a plate having a uniform thickness and a uniform width by 90 degrees.

10. (cancelled)

11. (withdrawn) A plasma processing apparatus comprising:

a processing chamber to perform a predetermined process on a workpiece;

a reaction tube connected to the processing chamber, the reaction tube being made of a dielectric material in the form of a cylinder;

a high frequency coil antenna located around the reaction tube to generate a plasma inside the reaction tube, the high frequency coil antenna including a portion that produces a relatively large capacitive coupling with the reaction tube and is formed between a power supply terminal connected to a plasma source high frequency power supply and a ground terminal connected to a ground, wherein said portion of the high frequency antenna is formed by twisting a plate having a uniform thickness and a uniform width by 90 degrees; and

a drive mechanism to move at least one of the high frequency coil antenna and the reaction tube relative to the other to perform the process on the workpiece.

12. (withdrawn) The apparatus according to claim 11, further comprising a rotary connector having a center shaft that is coaxial with the reaction tube, the rotary connector having an output unit rotatably supported by the center shaft and connected to the power supply terminal, the plasma source high frequency power supply being connected to the center shaft.

13. (currently amended) A plasma etching apparatus comprising:

an etching chamber to accommodate a workpiece;

a reaction tube connected to the etching chamber, the reaction tube including an axis, an outer circumference, and being made of a dielectric material in the form of a cylinder;

a coil antenna surrounding an outer wall of the reaction tube, the coil antenna including a first winding segment extending only partially around the outer circumference of the reaction tube at a first location along the axis of the reaction tube, a second winding segment extending only partially around the outer circumference of the reaction tube at a second location along the axis of the reaction tube, and an intermediate segment continuously formed with the first and second winding segments and successively extending between the first winding segment and the second winding segment in series;

a plasma generating power supply to supply high frequency power to the coil antenna; and

a drive mechanism to move at least one of the coil antenna and the reaction tube relative to the other to perform plasma etching on the workpiece, wherein the intermediate segment is located closer to ~~an outer peripheral surface~~ the outer circumference of the reaction tube than the first winding segment and the second winding segment.

14. (previously presented) The plasma etching apparatus according to claim 13, wherein the first winding and the second winding are parallel with each other and the intermediate segment is inclined with respect to the first winding and the second winding.

15. (withdrawn) The plasma etching apparatus according to claim 13, wherein the intermediate segment is thicker than the first winding and the second winding.

16. (withdrawn) The plasma etching apparatus according to claim 13, wherein an area of the intermediate segment that faces
the reaction tube is larger than areas of the first winding and the second winding that faces the reaction tube.

17. (previously presented) The plasma etching apparatus according to claim 13, further comprising a controller connected to the drive mechanism to control a relative moving speed between the coil antenna and the reaction tube.

18. (previously presented) The plasma etching apparatus according to claim 13, wherein the drive mechanism rotates the coil antenna around the reaction tube.

19. (withdrawn) The plasma etching apparatus according to claim 13, further comprising a rotary connector having a center shaft that is coaxial with the reaction tube, the rotary connector having an output unit rotatably supported by the center shaft and connected to the power supply terminal, the plasma source high frequency power supply being connected to the center shaft.

20. (withdrawn) The plasma etching apparatus according to claim 19, wherein the center shaft is a hollow shaft, and the etching apparatus further comprises:

a gas introducing port in communication with the hollow shaft for introducing the processing gas from above the processing chamber; and

a temperature sensor cable, which passes through the hollow shaft for adjusting the temperature in the processing chamber.

21. (previously presented) The plasma etching apparatus according to claim 3, wherein the sloped segment is wound approximately one-fourth of a way around the peripheral surface of the reaction tube.

22. (previously presented) The plasma etching apparatus according to claim 21, wherein each of the windings is wound approximately three-fourths of a way around the peripheral surface of the reaction tube.

23. (cancelled)

24. (currently amended) An inductively coupled plasma etching apparatus comprising:

a cylindrical reaction tube including an outer circumference and made of a dielectric material;

a single antenna located around the reaction tube to generate and maintain an inductively coupled plasma inside the reaction tube, the antenna including:

a first winding segment connected to a power supply;

a second winding segment connected at a ground; and

a capacitive coupling segment continuously formed with the first and second winding segments and successively extending between the first winding segment and the second winding segment to produce a relatively large capacitive coupling with the reaction tube, the capacitive coupling segment being closer to the outer circumference of the reaction tube than the winding segments, wherein the first winding segment, the capacitive coupling segment and the second winding segment form a single coil; and

a drive mechanism to move at least one of the antenna and the reaction tube relative to the other to perform plasma etching.

25. (previously presented) The inductively coupled plasma etching apparatus according to claim 24, wherein the capacitive coupling segment is located closer to the reaction tube than the first winding and the second winding.

26. (currently amended) An inductively coupled plasma etching apparatus comprising:

a reaction tube including an outer circumference;

a coil antenna, located around the reaction tube and having winding segments and a deformed ~~portion~~ segment that, upon moving at least one of the antenna and the reaction tube relative to the other to perform plasma etching, is capacitively coupled to cause an ion sheath to form along an inner wall surface of the reaction tube to decrease attachment of plasma etching products to the inner wall surface of the reaction tube, wherein the deformed segment, continuously formed with the winding segments, successively extends between one of the winding segments and the other one of the winding segments and is closer to the outer circumference of the reaction tube than the winding segments; ~~and~~

a drive mechanism to move at least one of the coil antenna and the reaction tube relative to the other to perform plasma etching on a workpiece; and

a controller connected to the drive mechanism to control a relative moving speed between the coil antenna and the reaction tube, wherein a uniformly distributed capacitive coupling between the coil antenna and the reaction tube reduces a depositing rate of etching products to extend a cleaning interval for cleaning inner walls of the reaction tube.